

REMARKS

This Amendment is respectfully submitted to place rejected claims of subject Application in condition for allowance. In particular, Claim 20 and Claim 21 have been canceled, and new Claim 22 has been
5 drafted to more particularly point out and distinctly claim the novel subject matter of the invention.

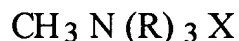
Applicants and their undersigned Attorney note with appreciation that Primary Examiner Griffin has withdrawn all previous rejections in view of amendments filed on February 11, 2003 with a
10 declaration under 37 CFR 1.131 to overcome the Yen et al. (US 6,402,939) reference of record.

New Claim 22 recites a process for the production of refinery transportation fuel or blending components for refinery transportation fuel, which process comprises:

15 hydrotreating a petroleum distillate consisting essentially of material boiling between about 50° C. and about 425° C. by a process which includes reacting the petroleum distillate with a source of hydrogen at hydrogenation conditions in the presence of a hydrogenation catalyst to assist by hydrogenation removal of sulfur
20 and/or nitrogen from the hydrotreated petroleum distillate;

fractionating the hydrotreated petroleum distillate by distillation to provide at least one low-boiling blending component consisting of a sulfur-lean, mono-aromatic-rich fraction, and a high-boiling oxidation feedstock consisting essentially of a sulfur-rich, mono-aromatic-lean
25 fraction boiling between about 200° C. and about 425° C.;

contacting the high-boiling oxidation feedstock with a soluble quaternary ammonium salt represented by formula



where X is a halogen, sulfate, or bisulfate anion, and the R's are the
30 same or different hydrocarbon moieties of at least 4 to about 10 carbon carbons, and an immiscible aqueous phase comprising a source

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of hydrogen peroxide, and at least one member of the group consisting of phosphomolybdic acid and phosphotungstic acid, in a liquid reaction mixture under conditions suitable for reaction of one or more of the sulfur-containing and/or nitrogen-containing organic compounds;

5 separating from the reaction mixture an essentially organic liquid and at least a portion of the immiscible aqueous phase; and

treating at least a portion of the recovered organic liquid with a solid sorbent, an ion exchange resin, and/or a suitable immiscible liquid containing a solvent or a soluble basic chemical compound, to
10 obtain a product containing less sulfur and less nitrogen than the oxidation feedstock.

Support for Claim 22 is found in the specification, for example, at page 11, line 30 to page 12, line 2, and at page 12, line 29 to page 13, line 2, and original claim 11.

15 Affidavit under Rule 1.132

An affidavit under Rule 1.132 of Dr. William H. Gong on the 12th day of February, 2004, identified as Paper No. 16, is hereby presented to further the prosecution of subject Application. In particular, the affidavit of Dr. Gong supports instant Claims 1 to
20 19 inclusive and Claim 22 which have been drafted and amended to claim Applicants' novel invention as described in the specification and original claims of subject application.

In 1984 William H. Gong received a Bachelor of Science degree in Chemistry from the Illinois State University, Normal,
25 Illinois, and a Doctor of Philosophy Organic Chemistry in 1990 from the Iowa State University of Science and Technology, Ames, Iowa.

From 1990 to the present, Dr. Gong has been employed by Amoco Chemical Company, now BP Chemicals, a corporation of the State of Delaware, and have the position of Research Associate
30 Scientist. His responsibilities have included "step-out" research in

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homogeneous catalytic oxygenation of alkylaromatic hydrocarbons, and reaction mechanism, and development of processes to catalytically oxygenate distillates and to selectively desulfurize distillates. Among his present professional assignments are

5 Technical Manager of Innovation Portfolio Group responsible for development of new catalytic oxidations processes; Technical consultant in areas of catalytic oxidation chemistry and reaction mechanism; and Manager of University Collaborations for the technology department of business unit.

10 Applicants and their undersigned Attorney appreciate Examiner's attention to the arguments of Dr. Gong in further consideration of this matter.

103 Rejections

In outstanding Final Office Action, Claims 1 to 19, and 21 were

15 rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No 6,217,748 in the name of Shigeto Hatanaka, Osamu Sadakane, and Hideshi Iki (Hatanaka et al.), in view of EP 0 482 841 A1 in the name of Frances Mary Collins, Andrew Richard Lucy, and David John Harry Smith (EP 0 482 841 A1), and U.S. Patent No

20 3,341,448 in the name of John Frederick Ford, Timothy Arrowsmith Rayne and Dennis George Adlington (Ford et al.). Applicants respectfully traverse this rejection.

It is the position of Applicants that Claims 1 to 19 inclusive and Claim 22, are allowable over the references of record since

25 these references fail to either teach or suggest the instant invention. Applicants believe that the rejections under 35 U.S.C. § 103(a) are not sustainable on the facts in this application.

In response the arguments in Paper No. 13 to overcome these rejections, Examiner avers: "that the claimed process produces

30 products having unexpectedly low levels of sulfur and nitrogen is not

persuasive because the combination of the refining steps of the applied prior art would result in the expectation of a product having a sulfur content lower than that of a product treated only by one of the refining steps.” and further; “that the Takacs reference's teaching of washing with a carbonate solution is not useful to treat a petroleum derived mixture is not persuasive because the teachings of the reference are applicable to a number of compositions including gasoline. The treatment of the pine oil in the example cannot be interpreted to mean that the treatment is not useful for a petroleum mixture.”

In view of the “132” affidavit of Dr. Gong, it is submitted that the Examiner’s position with respect to a combination of steps from three (or four) different processes would result in the expectation of the improved product provided by Applicants’ novel process is untenable.

As the affidavit of Dr. Gong states, the combination of steps for purification of petroleum derived streams generally does not product a purer product than fewer steps. For those who are generally skilled in the arts of analytical and organic chemistries, two processes cannot usually be linked together to produce a purer product. Therefore, a novel process that provides an improved product is not obvious. For example, solvent extraction usually precedes an adsorption process. But, if the extraction unavoidably leaves behind traces of solvent and the traces of solvent cannot be removed, then this solvent will interfere with a subsequent adsorption process. Such solvents include dimethyl sulfoxide, for example. When this solvent enters an adsorption column, it will immediately occupy the active sites of the adsorbent and immediately render the adsorbent ineffective. In this case, one cannot combine both processes to produce a purer product.

On the other hand, if water were used in a liquid-liquid extraction, the extracted product can be readily dehydrated to remove traces of water, and then the product can be subjected to an

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adsorption process without interference from water. Because water is in fact used in the process, we can couple a solvent extraction process with an adsorption process to produce a product of superior purity

5 Available evidence strongly suggests that ultra-low sulfur fuel is a significant technology enabler for catalytic treatment of diesel exhaust to control emissions. Fuel sulfur levels of below 15 ppm, likely, are required to achieve particulate levels below 0.01 g/bhp-hr. Such levels would be very compatible with catalyst combinations for exhaust treatment now emerging, which have shown capability to
10 achieve NO_x emissions around 0.5 g/bhp-hr. Furthermore, NO_x trap systems are extremely sensitive to fuel sulfur and available evidence suggests that they need would need sulfur levels below 10 ppm to remain active. Therefore, a critical element of Applicants' novel process is reduction of nitrogen.

15 Examples of Applicants' novel process demonstrated that their process removed more than 95 percent of the of the sulfur and nitrogen (See Example 3 where 99.3 percent sulfur was removed, i.e., from 48 ppm sulfur and 49 ppm nitrogen to 0.3 ppm sulfur and 2.5 ppm nitrogen, Example 4 where 97.5 percent sulfur was removed, i.e.,
20 from 24 ppm sulfur and 16 ppm nitrogen to 0.3 ppm sulfur and 2.5 ppm nitrogen, and Example 5 where 99.4 percent sulfur was removed, i.e., from 70 ppm sulfur to 0.4 ppm sulfur).

Claim 20 was rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No 6,217,748 (Hatanaka et al.), in view
25 of EP 0 482 841 A1 and U.S. Patent No 3,341,448 (Ford et al.) as applied to Claim 17 above, and further in view of U.S. Patent No. 3,909,395 in the name of Edward Andrew Takacs (Takacs). Applicants respectfully traverse this rejection, however Claim 20 has been canceled.

30 Base on the amendments submitted, previously and herein, and Paper No. 16 (affidavit under 37 CFR. § 1.132), Applicants urge

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that Claims 1 to 19 inclusive and Claim 22, all claims now presented, are in condition for allowance. Applicants respectfully request Primary Examiner Griffin to pass subject application for allowance.

5 Do not hesitate to contact Frederick S. Jerome whose telephone number is (630) 832-7974 (FAX (630) 832-7976) if additional assistance is needed regarding this paper or earlier papers for Applicants.

10 Applicants and their undersigned Attorney appreciate Examiner's attention and further consideration of this matter.

Respectfully submitted,



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